

CLAIMS

We claim:

1. A method for implementing a thermodynamic cycle comprising the steps of:
 - transforming thermal energy from a fully vaporized boiling stream into a usable energy form to produce a lower pressure, spent stream;
 - transferring thermal energy from an external heat source stream to a boiling stream to form the fully vaporized boiling stream and a cooled external heat source stream;
 - transferring thermal energy from the spent stream to a first portion of a heated higher pressure, basic working fluid stream to form a partially condensed spent stream and a first pre-heated, higher pressure, basic working fluid stream;
 - transferring thermal energy from the cooled external heat source stream to a second portion of the heated higher pressure, basic working fluid stream to form a second pre-heated, higher pressure, basic working fluid stream and a spent external heat source stream;
 - combining the first and second pre-heated, higher pressure basic working fluid streams to form a combined pre-heated, higher pressure basic working fluid stream;
 - separating the partially condensed spent stream into a separated vapor stream and a separated liquid stream;
 - pressurizing a first portion of the separated liquid stream to a pressure equal to a pressure of the combined pre-heated, higher pressure basic working fluid stream to form a pressurized liquid stream;
 - combining the pressurized liquid stream with the combined pre-heated, higher pressure basic working fluid stream to form the boiling stream;
 - combining a second portion of the separated liquid stream with the separated vapor stream to form a lower pressure, basic working fluid stream;
 - transferring thermal energy from the lower pressure, basic working fluid stream to a higher pressure, basic working fluid stream to form the heated, higher pressure, basic working fluid stream and a cooled, lower pressure, basic working fluid stream;
 - transferring thermal energy from the cooled, lower pressure, basic working fluid stream to an external coolant stream to form a spent coolant stream and a fully condensed, lower pressure, basic working fluid stream; and
 - pressurizing the fully condensed, lower pressure, basic working fluid stream to the higher

30 pressure, basic working fluid stream.

1 2. The method of claim 1, wherein the external heat source stream is a geothermal stream.

1 3. A method for implementing a thermodynamic cycle comprising the steps of:

2 transforming thermal energy from a fully vaporized basic working fluid stream into a usable
3 energy form to produce a lower pressure, spent stream;

4 combining the spent stream with a depressurized liquid stream to form a lower pressure
5 mixed stream,

6 transferring thermal energy from the lower pressure mixed stream to a first portion of a pre
7 heated higher pressure, basic working fluid stream to form a cooled mixed lower pressure stream
8 and a first heated, higher pressure, basic working fluid stream;

9 separating the cooled mixed lower pressure stream into a separated lower pressure vapor
10 stream and a separated lower pressure liquid stream;

11 mixing a first portion of the separated liquid stream with the separated vapor stream to form
12 a second mixed lower pressure stream,

13 transferring thermal energy from the second mixed lower pressure stream to a higher
14 pressure, basic working fluid stream to form a pre-heated higher pressure, basic working fluid
15 stream and a cooled second mixed lower pressure stream,

16 condensing the cooled second mixed lower pressure stream with an external cooling stream
17 to form a fully condensed lower pressure basic working fluid stream,

18 pressuring the fully condensed lower pressure basic working fluid stream to form a higher
19 pressure basic working fluid stream,

20 transferring thermal energy from a thrice cooled external heat source stream to a second
21 portion of the pre-heated higher pressure basic working fluid stream to form a second heated higher
22 pressure basic working fluid stream and a spent external heat source stream,

23 combining the first and second heated higher pressure, basic working fluid streams to form
24 a combined heated, higher pressure, basic working fluid stream;

25 transferring thermal energy from a twice cooled external heat source stream to the combined
26 heated, higher pressure basic working fluid streams to form a hotter higher pressure basic working
27 fluid stream and the thrice cooled external heat source stream;

28 combining a higher pressure separated vapor stream with the hotter higher pressure basic

working fluid stream to form a mixed higher pressure stream;
transferring thermal energy from a once cooled external heat source stream to the mixed higher pressure stream to form the twice cooled external stream and a partially vaporized higher pressure stream,
separating the partially vaporized higher pressure stream into a second separated vapor higher pressure stream and a second separated higher pressure liquid stream;
transferring thermal energy from an external heat source stream to the second separated vapor higher pressure stream to form the once cooled external heat source stream and the fully vaporized basic working fluid,
reducing the pressure of the second separated higher pressure liquid stream to form a reduced pressure mixed stream;
separating the reduced pressure mixed stream into the first separated vapor stream and a first reduced pressure separated liquid stream, and
reducing the pressure of the reduced pressure separated liquid stream into the lower pressure liquid stream.

4. The method of claim 3, wherein the external heat source stream is a geothermal stream.